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Introduction

Multisided platform markets characterized by network externalities have always existed as an economic paradigm, but in different technological forms.¹ The old village marketplace, physical shopping malls, or any traditional fair can be seen as multisided platform markets connecting buyers and sellers. They are all platform-meeting places where different agents that want to interact and transact with one another are brought together by an intermediary. The traditional printed ad-based newspaper is also a classic version of a platform connecting advertisers and eyeballs. More readers increase the value for advertisers that want to reach them, and readers generally are indifferent to or dislike ads. Due to these externalities across the different sides, newspapers can often be provided for free to create an audience for advertisers. Payment cards of various kinds, the first two-sided market closely studied in the industrial organization literature, are also a typical example of platforms that connect merchant and cardholders concluding transactions.

The current wave of technological change has created a new generation of multisided platforms that dominate the digital economy: online search engines connecting searchers with advertisers; social networks connecting users with other users and advertisers; e-commerce online marketplaces connecting buyers and sellers; sharing economy platforms connecting various kinds of service provider with consumers; price-comparison, reservation, and job search platforms, and match-makers for various professional services. Due to digitalization, the multisided business model has become one of the predominant forms of organizing economic activity in the age of big data, network effects, and algorithmic-based matching.

This new generation of digital multisided platforms and their widespread growth has generated lively and complex debates that touch on many important areas of public policy, ranging from concerns about privacy, misuse of personal data, consumer protection, spread of fake news, and excessive concentration of economic power. Even within the competition policy domain, the focus on multisided platform markets

¹ The term “multisided platform” is the most accurate way to refer to this economic paradigm. Equivalent terminology found in the literature, however, will at times be used interchangeably throughout this book, including “two-sided” or “multisided market.”

has expanded as a result of the rise of large tech platforms, partially shifting away from the original question of whether new legal tools need to be developed in competition law cases to account for the economic interdependence of multiple sides.

The growth of digital platforms has, in particular, turned the attention of competition policy debates to the increasing levels of concentration characterizing various digital industries and the perceived weakness of competition and market forces to address market power in the digital economy, often emphasizing the inaptitude of established competition policy principles to deal with the economic and technological features of the digital platforms. For example, it has been argued that current antitrust laws are “unequipped to capture the architecture of market power in the modern economy”² and the digital economy will lead to “the end of competition as we know it.”³ Radical proposals to fragment excessively concentrated digital sectors have as a result gained prominence in the academic and policy debate, including calls to break up tech giants such as Facebook or Google,⁴ or implement major reforms to the goals, doctrines, and fundamental principles pursued by antitrust policy to fight excessive accumulation of economic and political power⁵ – for example, abandoning the consumer welfare standard in favor of more structural approaches that promote deconcentration of markets as an objective in and of itself.

In contrast, other commentators have instead emphasized a number of reasons against intervention in these digital markets, criticizing, among other things the use of labels such as “network effects” and “big data” as empty slogans that in reality do not determine inevitable market dominance, citing various counterexamples of platforms such as AOL, MSN Messenger, Friendster, Myspace, Orkut, that have declined despite network effects and collection of data;⁶ emphasizing the detrimental risks of false positives⁷ in highly innovative markets;⁸ arguing that entry barriers

² Lina M. Khan, “Amazon’s Antitrust Paradox” (2016) 126 Yale Law J 710.

³ Ariel Ezrachi and Maurice E. Stucke, *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy* (Cambridge, MA: Harvard University Press, 2016).

⁴ *Financial Times*, “Big Tech and Amazon: Too Powerful to Break Up?”; Jonathan Taplin, “Opinion: Is It Time to Break Up Google?,” *New York Times* (January 20, 2018), online: www.nytimes.com/2017/04/22/opinion/sunday/is-it-time-to-break-up-google.html; *The Guardian*, “Elizabeth Warren Vows to Break Up Amazon, Facebook and Google if Elected President” (March 8, 2019), online: www.theguardian.com/us-news/2019/mar/08/elizabeth-warren-amazon-facebook-google-big-tech-break-up-blogpost; Jonathan Taplin, *Move Fast and Break Things: How Facebook, Google, and Amazon Cornered Culture and Undermined Democracy* (New York: Little, Brown, 2017); Scott Galloway, *The Four: The Hidden DNA of Amazon, Apple, Facebook, and Google* (Basingstoke: Penguin, 2017).

⁵ Konstantin Medvedovsky, “Antitrust Chronicle – Hipster Antitrust” (April 18, 2018), available at www.competitionpolicyinternational.com/antitrust-chronicle-hipster-antitrust/.

⁶ David S. Evans and Richard Schmalensee, “Network Effects: March to the Evidence, Not to the Slogans,” SSRN Scholarly Paper ID 3027691 (Rochester, NY: Social Science Research Network, 2017).

⁷ David S. Evans, “Multisided Platforms, Dynamic Competition, and the Assessment of Market Power for Internet-Based Firms,” SSRN Scholarly Paper ID 2746095 (Rochester, NY: Social Science Research Network, 2016); David S. Evans and Richard Schmalensee, “Debunking the ‘Network Effects’ Bogeyman,” SSRN Scholarly Paper ID 3148121 (Rochester, NY: Social Science Research Network, 2017).

⁸ Hal R. Varian, “Economics of Information Technology” (2003) Univ Calif Berkeley, available at <http://people.ischool.berkeley.edu/~hal/Papers/mattioli/mattioli.pdf>.

are low, multihoming and low switching costs are negligible; and that competition is simply “one click away.”⁹

In between, various intermediate positions support different degrees of stronger competition policy enforcements. Among others, Shapiro has suggested for example that strengthening of merger enforcement may be necessary, together with stronger enforcement against exclusionary conduct by dominant firms.¹⁰ Tirole has endorsed a form of competition policy intervention oriented to competition for the market, one that fosters contestability of a potential monopoly position rather than competition within a market due to the winner-takes-all nature of digital industries.¹¹ Likewise, a number of official reports in various jurisdictions support variants of more interventionist approaches.¹² A disparate range of largely different policy proposals and approaches, as a consequence, animates policy debates on how to tame – borrowing from the words of the *Economist* – the new titans.¹³

The goal of this book is to provide a novel contribution and perspective to the challenges of competition and market power in digital platform markets through the theoretical lenses supplied by the natural monopoly framework. Traditionally, natural monopolies are associated with infrastructures such as electricity distribution, water supply, or railroads that entail large fixed costs and high barriers to entry. Due to large economies of scale relative to the size of demand, the cost structure of a natural monopoly is such that a single firm will serve a market more efficiently than competing firms. As a result, rather than promoting competition, entry, and fragmentation, the standard policy approach has been to welcome or encourage

⁹ Federal Trade Commission, Regulation in High-Tech Markets: Public Choice, Regulatory Capture, and the FTC, Remarks of Joshua Wright, available at www.ftc.gov/system/files/documents/public_statements/634631/150402clmson.pdf; Joshua Wright, Koren Wong-Ervin, Douglas Ginsburg, Bruce Kobayashi, and James Cooper, Comment of the Global Antitrust Institute, George Mason University School of Law, on the European Commission’s Public Consultation on the Regulatory Environment for Platforms (December 29, 2015), available at http://masonlec.org/site/rte_uploads/files/GAI_Comment%20on%20EC%20Platform%20Consultation_12-29-15_FINAL.pdf.

¹⁰ Carl Shapiro, “Antitrust in a Time of Populism,” SSRN Scholarly Paper ID 3058345 (Rochester, NY: Social Science Research Network, 2017). Carl Shapiro, “Protecting Competition in the American Economy: Merger, Control, Tech Titans, Labour Markets” (2019) 33 *Journal of Economic Perspectives*, 69.

¹¹ Jean Tirole, *Economics for the Common Good* (Cambridge, MA: Princeton University Press, 2017); Allison Schrager, “A Nobel-Winning Economist’s Guide to Taming Tech Monopolies,” *Quartz* (June 27, 2018), available at <https://qz.com/1310266/nobel-winning-economist-jean-tirole-on-how-to-regulate-tech-monopolies/>.

¹² See, for instance, George Stigler Center for the Study of the Economy and the State – University of Chicago Booth School of Business, *Report by the Committee for the Study of Digital Platforms Market Structure and Antitrust Subcommittee* (May 15, 2019); UK Report of the Digital Competition Expert Panel, *Unlocking Digital Competition* (March 2019); European Commission, *Competition Policy for the Digital Era*, Final Report (April 4, 2019); Australian Competition and Consumer Commission, *Digital Platform Inquiry*, Final Report (July 26, 2019).

¹³ *The Economist*, “How to Tame the Tech Titans” (January 18, 2018), available at www.economist.com/leaders/2018/01/18/how-to-tame-the-tech-titans.

concentration toward a natural monopoly while at the same time regulating ex ante the natural monopolist's behavior and the resulting market power.

The natural monopoly paradigm becomes potentially pertinent in the context of digital platforms because, even though platform intermediation is in itself not a new economic model, technological change appears to enhance the tendencies toward concentration compared to older, traditional physical predecessors of platforms: the collection and analysis of data as the cornerstone of prediction technologies and algorithmic-matching services create important scale and scope economies that were not available to the same degree to the previous generation of platforms; the digital, as opposed to physical, dimension of intermediaries increases the potential for large supply-side scale economies with low or zero marginal costs, as well as expanding the scope of matching capabilities for users that benefit from network externalities. Due to these various forms of scale enhanced by technological change, the natural monopoly paradigm becomes as a result a more fruitful theoretical starting point to evaluate concerns about market power in current digital platform markets than one provided by competition, entry, and market fragmentation, as well as a useful benchmark to evaluate alternative policy approaches that are consistent with efficient concentration and winner-takes-all markets.

On this basis, the first objective of this book is to investigate whether and how technological change and digitalization have promoted the emergence of natural monopolies in digital platform markets, and, if so, what kind of natural monopolies. Through an in-depth analysis of three case studies – horizontal search engines, e-commerce marketplaces, and ride-hailing platforms – this book will particularly highlight the different ways in which digitalization and technological change augment the tendencies toward natural monopoly, but with different degrees of natural concentration and contestability across digital industries.

Building on the conclusions derived from the application of the natural monopoly framework, the second goal of this book is to then draw more general principles that may serve as guiding tenets for policy approaches to competition and market power in digital platform industries as a whole beyond the three analyzed sectors. Highlighting the specific institutional limitations of alternative forms of intervention, this book will contend that the economic and technological features of digital platform markets overall challenge the dichotomy between ex ante and ex post approaches to market power, and thus demand rethinking the interface between regulation and competition policy.

1.1 THREE CASE STUDIES: A SPECTRUM OF NATURAL CONCENTRATION

As the book attempts to illuminate through the concrete illustration of three case studies, there are various and heterogeneous economic factors potentially associated with natural monopolies in digital platform markets, which include in particular: supply-side economies of scale often with negligible marginal costs, demand-side

network externalities (both direct and indirect), and economies of scale related to data collection and analysis. The presence of these various forms of scale does not mean that natural monopolies are inevitable or that the emergence of a natural monopoly is necessarily driven by the platform model alone. Rather, the complex interplay between various economies of scale and possible counterforces against natural concentration shows that the technological features characterizing the current wave of digital platforms overall increase the likelihood of natural monopolies compared to older, standard examples of platform markets, but also that natural monopoly features vary substantially across digital platforms with different degrees of natural concentration.

In the first case study, for example, the book suggests that horizontal search¹⁴ has the features of a natural monopoly. First, a horizontal search engine such as Google Search has a cost structure with high fixed costs and very low, arguably zero, marginal costs on the supply side creating economies of scale akin to standard network industries. Second, access to data is another key driver of natural concentration. Data are essential because at the core a horizontal search engine is a general-purpose prediction technology rather than simply a matching technology. While the matchmaking function and indirect network externalities between advertisers and searchers arising from the multisided matching model are contributing factors to concentration, they play only a limited role and are, in fact, tangential to the inevitable tendency toward a single horizontal search monopoly. On the contrary, the value of data and the economies of scale and scope that arise from larger datasets are critical for the purpose of improving search algorithm *predictions* as opposed to matching, where more data increase the efficiency of search results in terms of quality-adjusted costs. Moreover, due to the *universal* reach of horizontal search, specific data can have a positive value not only for a given narrow search query but also for a larger subset of related queries for which the same data points can be valuable. The predictive and universal nature of horizontal search are such that data can give rise to a natural monopoly.

Different conclusions are, however, reached in the second case study of e-commerce marketplaces. While online shopping marketplaces benefit from positive network externalities between buyers and sellers, product differentiation represents an important counterforce against natural concentration. Likewise, economies of scale at play in the development of logistics do not appear strong enough to generate a natural monopoly. On the contrary, the competitive advantage of successful marketplaces comes from having combined a large online marketplace with efficient storage and delivery infrastructure better than competitors. Amazon, for example, faces competition from other online marketplaces, and it is not the only firm providing delivery, but it is the firm that combines

¹⁴ The term “horizontal” or “general” refers to search engines that provide any type of results covering any search query as opposed to “vertical” or “specialized” search engines that focus only on specific topics.

these two aspects in the most efficient and successful way, which explains its dominance. The fact that the physical infrastructure developed for storage and logistics plays a major role in e-commerce also shows that dominance can only partially be explained by the fact that an online marketplace like Amazon (in itself a hybrid between marketplace and reseller) can be described as a multisided platform.

The third case study of on-demand transportation services provides more ambiguous result. On the one hand, ride-hailing platforms benefit from a technological upgrade of the traditional dispatch mechanism through algorithmic matching that relies on data about drivers and passengers, coupled with the ability to call a ride and pay through an app. Overall, this form of matching benefit from substantial demand-side economies of scale through the creation of large networks, suggesting the plausibility of some natural monopoly features – among other things, bigger and denser networks that reduce waiting times are critical for services offered on demand, and more users contribute to the development of rating and review mechanisms important for solving issues of asymmetric information. On the other hand, the value of network externalities and the ability to improve matching tapers off after a critical mass of users is reached and the supply-side costs of entry are not particularly high. These considerations suggest that competition may be possible depending on the specific conditions of demand in a given geographical market – including the size of demand, density of population, and availability of alternative methods of transportation. As a result, ride-hailing platforms are located somewhere in between the strong natural monopoly features of horizontal search and the e-commerce's lack thereof.

The concrete illustration of the heterogeneous economic features and context-specific regulatory issues at play in each analyzed sector illuminates broader principles that may be pertinent to digital platform industries as a whole. First, the evaluation of the natural monopoly framework shows that digitalization and technological change increases the likelihood of natural monopoly in digital platform markets, albeit with different degrees of efficient and natural concentration across industries. Second, the identification of various forms of scale at play in digital platform markets and their technological features suggest that, depending on the source of concentration, some of these industries may be characterized by different degrees of contestability compared to standard public utilities and network industries based on physical infrastructures. Where the latter are generally the result of subadditive cost structures on the supply side – for example developing an electricity grid – natural monopolies in digital industries may emerge due to different factors such as demand-side scale created by direct and indirect network externalities. These types of natural monopoly can in some instances potentially be made more contestable than standard network utilities through policy intervention that promotes switching across platforms and entry for displacement.

1.2 RETHINKING THE INTERFACE BETWEEN COMPETITION POLICY AND REGULATION

The identified structural features of digital industries resulting from different degrees of natural monopoly features and contestability, as well as market power concerns associated with concentrated market structures challenge in complex ways the dichotomy between regulation and competition policy intervention. This book in particular contends that digital platform industries test the institutional limitations of *ex ante* and *ex post* approaches, suggesting that solutions to their respective institutional shortcomings will inevitably entail the need to rethink competition and regulatory solutions as complementary rather than substitute approaches to market power.

In theory, *ex ante* approaches could be a first-best response to some of the problem associated with a natural monopoly platform. However, not only the relevance of the standard paradigm of price and entry regulation is limited to platforms that are naturally monopolistic, but even when pertinent the concrete institutional implementation of regulation is rather imperfect and replete with various institutional limitations, including the costs of regulation, asymmetric information, rapid technological change, and the risks of regulatory capture. Most importantly, regulation risks entrenching current established market positions and as a result can undermine or slow down the process of technological innovation and dynamic displacement generally characterizing digital industries. Hence, the various costs and institutional limitations associated with the concrete implementation of standard *ex ante* regulation implemented by an industry-specific regulator are likely in many cases to outweigh the magnitude of market imperfections that regulation attempts to address.

While in a limited set of instances alternative approaches such as franchise bidding may provide a substitute option to regulation, intervention against market power in digital industries will, in most cases, demand reliance on *ex post* competition policy intervention. The approach dictated by structural features of these industries will be one focused on facilitating a form of Schumpeterian competition and cycles of monopoly displacement rather than market fragmentation. In order to do so, competition policy must be able to achieve two necessary objectives: a) preserve a degree of contestability by encouraging the threat of entry and facilitating the process of displacement by targeting innovation-based harms; and b) address market power exercises such as monopoly leveraging and discriminatory access to bottleneck inputs in an effective and expeditious way, especially in sectors where contestability is expected to be lower.

On the one hand, this approach has many virtues. It avoids the institutional costs and complexities of *ex ante* regulation; it reduces the need to directly regulate certain forms of inefficient behavior; and unlike regulation, it fosters incentives to cyclical displacement and innovation. On the other hand, as in the case of standard price and entry regulation, this policy approach to digital

platform competition is affected by its own specific institutional limitations and constraints, due to the quasi-regulatory approach imposed by the features of digital industries. For instance, achieving the goal of contestability may often require forms of regulatory intervention that enable portability across platforms to facilitate entry and switching for users. Similarly, addressing some of the central market power concerns such as discrimination and leveraging will be difficult to achieve through antitrust enforcement characterized by slow and complex procedures, case-by-case adjudication, and remedies such as the application of the essential facilities doctrine that ultimately require ongoing administration akin to regulatory oversight.

On the basis of these conclusions, this book contends that the features of digital platforms and the resulting market power issues at play in these industries overall challenge the standard dichotomy between *ex ante* and *ex post* forms of intervention and require rethinking the interplay between competition policy and forms of regulatory oversight as complementary forms of intervention. As highlighted throughout the book, such a complementarity is, in particular, dictated by critical institutional trade-offs and limitations of alternative policy approaches that are pertinent to digital platform industries in light of the identified spectrum of natural monopoly features and contestability.

The conclusions reached in this book depart from the prevailing positions in favor of or against intervention in digital markets. *Laissez-faire* arguments generally underplay the ability of dominant platforms to abuse market power to protect themselves from threats of disruption, to delay displacement, and to foreclose adjacent markets, placing excessive emphasis on the role of market forces alone to erode high profits and market power. For their part, many of the proposals in favor of stronger antitrust intervention place excessive emphasis on the ability of competition, entry (conceived in terms of static competition between platforms), and induced market fragmentation to solve market power concerns in digital markets: proposals that attempt to fix competition by way of substantive changes to competition laws, for example, abandoning the consumer welfare standard, or by way of horizontal break-up of tech giants to fragment markets, clash with the contention that technological change makes platform markets overall more prone to efficient and natural concentration. More refined and nuanced positions that build on and apply Schumpeterian arguments to the tech sector are closer to the position defended in this book, insofar as they focus on favoring entry that aims at monopoly displacement and dynamic competition rather than fragmentation and static competition. However, these positions often assume away critical differences within digital platform markets, as well as important institutional constraints of *ex post* enforcement that this book attempts to highlight, suggesting on the contrary the need for forms of regulatory intervention to complement competition policy enforcement.

1.3 OUTLINE

This book is structured as follows. Chapter 2 introduces the natural monopoly framework in the context of digital platform markets. First, it discusses the technological and economic features that differentiate the current wave of digital platforms from older traditional examples of platform markets and explains the general legal and policy challenges raised by the increasing centrality of platform markets as a whole. Then, the chapter identifies potential key drivers of natural monopoly in digital platform markets. This general framework is subsequently applied to the specificities of three digital industries: online horizontal search (Chapter 3); e-commerce marketplaces (Chapter 4); on-demand ride-hailing platforms (Chapter 5). Building on the conclusions reached in the case studies, Chapter 6 evaluates alternative policy tools and identifies general guiding principles to address competition and market power for digital platform markets, pointing to the institutional dimension of intervention and the way in which it requires rethinking the interplay between competition policy and forms of ex ante regulation. Chapter 7 concludes by highlighting the theoretical contributions of this book and some of the open policy questions.